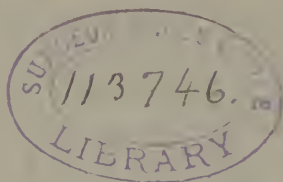
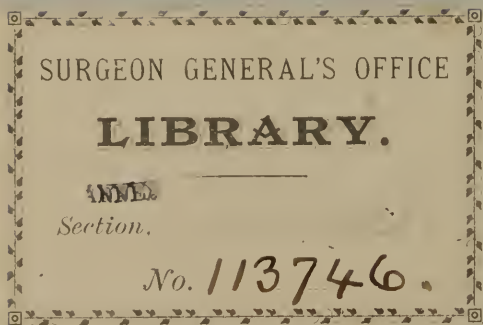


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DISEASES OF THE PANCREAS



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THE
DISEASES OF THE PANCREAS

AND THEIR

HOMŒOPATHIC TREATMENT.

BY

✓
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PREFACE.

Every book comes to us more or less a stranger. Every stranger needs an introduction. Many a book fails of appreciation because it is not properly presented, especially is this true of scientific works. Aside from what the title page tells; why it came to be written, the progress of its growth, and especially the particular sphere it is to occupy are matters of deep interest.

Every book has a history of its own. This one had its origin with a committee of experts appointed by the [Homœopathic Medical Society of Philadelphia County] to prepare an essay on some important medical subject. They choose that neglected organ the Pancreas and its Diseases. Prof. Thomas ably marked out the position of the Pancreas, its size, shape and peculiar functions; Prof. Morgan, with rare tact presented a digest of all that is really known of the etiology and special pathology of the singular diseases of the Pancreas and their relations to those of other adjacent organs. Prof. Korndœrfer skillfully outlined the differential diagnosis and prognosis of the Pancreatic diseases; while Prof. Farrington wisely selected the remedies Homœopathic to these diseases.

This most masterly contribution to medical science was found buried in the Transactions of the Homœopathic Medical Society of Pennsylvania, and believing that many physicians would welcome its help in elucidating many an obscure case, the Publishers secured permission for a reissue. The articles were revised by the authors, and

after securing wide attention through the columns of *The United States Medical Investigator*, are here rearranged and presented in a permanent form for convenient reference.

When we consider the difficulties that beset this committee, from the obscure nature of pancreatic diseases, and its remoteness from diagnostic fields, and the meagreness of pancreatic remedy symptoms, we are filled with admiration at the result, and can point with pride to this work as filling a most important vacancy in American medical literature. That the pioneer work on diseases of the Pancreas hails from Homœopathic sources is no small honor. It will serve as a useful guide, and at the same time as a nucleus for the observations of the profession.

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THE DISEASES OF THE PANCREAS.

CHAPTER I.

ANATOMY AND PHYSIOLOGY.

ANATOMY AND ANOMALIES OF THE PANCREAS.

Comparative Anatomy.—The physiological value of any organ may be fairly estimated from the constancy of its presence in the animal series. Applying this test to the pancreas, the inference is a logical one, that this gland is one of great importance in every animal.

While in no animal lower than articulates is found an organ recognized as a pancreas, it is by no means certain that lower forms may not require, and be furnished with a secretion identical with that of the pancreas, the common digestive surfaces being sufficient, by means of their numerous follicles, to furnish a pancreatic as well as a biliary secretion.

In the lower articulates certain cæcal appendages, opening into the stomach, are believed to furnish this secretion, while in higher forms, including the insects, numerous distinct follicles, or short cæcal ducts, open into and discharge

a fluid into the intestines, which is looked upon as identical with the pancreatic secretion of higher animals.

In the vertebræ series, where we find a greater specialization of tissues and organs, the pancreas becomes more positive in its development, and more readily recognized. In some of the lower fishes, however, there appears to be no pancreas proper, a copious secretion from the intestinal tract evidently furnishing this digestive fluid with the intestinal mucus. In most fishes, however, we find a series of long slender pouches opening into the upper portion of the intestine, generally in a circle around the tube. In most cases these tubes open separately into the intestines; in others, numerous tubes unite, forming a common duct, the tubes being held together by connective tissue, thus approaching the more complex form of the gland in the higher vertebrates.

In reptiles, the pancreas loses its tubular form, becoming a well developed glandular mass, presenting a variety of forms, generally contained within peritoneal folds; of a light gray or yellowish and sometimes pinkish color, and composed of numerous acini, each of which gives origin to a duct, these again uniting and forming larger ones, the ultimate duct finally opening into the intestine either in company with, or near to the biliary duct.

In birds, where there is no mastication of food in the mouth, and hence an imperfect development of salivary glands, we find a large pancreas associated with their gastric mastication. In these animals, the pancreas consists of two and sometimes three narrow, elongated portions, placed between folds of the duodenum, and supported by the omentum. The substance of the gland is firmer than in reptiles, of a pinkish, yellowish, or brownish color, and of a conglomerate structure. The ducts, usually two, but sometimes

three in number, open into the intestines at a point higher, as a rule, than the bile duct.

In the mammalia, this gland differs from that in birds chiefly in the progressive development of a transverse portion, directed towards the spleen, which in man becomes the main portion of the gland. In the monotremata, which form the connecting link between birds and mammals, it resembles, in structure, the gland in animals.

In the rodentia, the pancreas presents the peculiarity of its ducts opening into the intestine at a considerable distance below the common bile duct; in the beaver, the termination being eighteen inches below that duct. Physiologists have availed themselves of this peculiarity in the rabbit, which belongs to this class, for experimental research on the action of the bile on the intestinal contents, before their admixture with the pancreatic secretion.

In the elephant, the pancreas is large, and provided with two ducts, one of which opens into the gall-bladder, where the secretion is mixed with the gall, while the other opens into the duodenum lower down.

In the carnivora, the pancreas is long and narrow, with as distinct duodenal portion; the duct usually communicating with the bile duct before opening into the intestine. In the cat, a small reservoir is found for the secretion, with a distinct duct which opens into the common duct, before that unites with the bile duct.

Human Anatomy.—The pancreas of man is situated in the upper and back portion of the abdominal cavity, extending transversely from the duodenum on the right toward the spleen, which it frequently touches on the left. The enlarged right extremity, usually termed the head, is in close relation to, and grasped by the concave border of the duodenum. The body of the gland rests upon the superior

mesenteric artery and vein, and extending transversely, tapers, ending in the left small extremity or tail. Its length varies from six to eight inches and its weight from two to four ounces. It is held in position by its close attachment to the duodenum on the right, by its adhesions to the blood-vessels behind, and by the ascending layer of the transverse mesocolon which passes in front.

In structure, the pancreas is a compound racemose or conglomerate gland, resembling, strongly, the salivary glands, though looser and softer in structure. It is made up of numerous small lobules, united by loose connective tissue, these being composed of microscopic vesicles varying from the 1-200 to 1-400 of a line in diameter.

The excretory ducts, originating in some obscure manner among the cells, unite, forming larger and larger branches, ending, finally, in the main excretory duct, which has been named from its discoverer, the duct of Wirsung.

The canal or duct of Wirsung, extends through the whole length of the gland nearer the lower border, increasing gradually in size, until, upon reaching the duodenum, it acquires the size of a quill. Uniting with the main duct, is not unfrequently found a supplementary duct springing either from some portion of the head, or from that portion projecting from the posterior portion of the body, known as the lesser pancreas; this unites with the main duct, which, upon reaching the duodenum, unites with the ductus communis choledochus, and passing obliquely with that through the coats of the intestine, they terminate, usually, by a single orifice at the apex of a papilla of the mucous membrane.

The pancreas is supplied with blood, partly from the splenic artery which passes along its upper border, and partly by the pancreatico-duodenalis artery. Its venous

blood is returned to the portal vein through the splenic and superior mesenteric veins. It receives its nerves from the solar plexus of the sympathetic.

The position of the pancreas may be indicated upon the surface of the abdomen by a line drawn transversely at a point about midway between the umbilicus and the lower end of the ensiform process of the sternum. To reach the gland in post-mortem examination, the great omentum should be torn from the lower border of the stomach, when by lifting the latter and dragging down the transverse colon, the pancreas may be seen in the back part of the cavity of the lesser omentum.

ANOMALIES OF THE PANCREAS.

Anomalies of Location.—*Surgically:* The gland is occasionally displaced, along with the stomach, colon, or spleen, through a hernial opening or a laceration of the diaphragm, into the thoracic cavity, or into the umbilicus, or a wound of the abdominal parietes. In the last named injury, the head of the pancreas has been found protruding, and, being cut away, the healing process went on without interruption. Again, in one instance, that of a woman, the tail of the pancreas has been found displaced upwards, at nearly a right angle with its body, the cause being unknown.

Medically.—We have to consider: First, the possibility of invagination of the gland, with the duodenum, into the adjacent colon, such a case being recorded; second, the sloughing off of bits of the pancreas in connection with adjacent gall-stone accumulations; Rokitansky having observed such a case, in which a considerable portion of the gland was found in the stools, the canal of Wirsung being plainly visible in the fragment.

Anomalies of Structure.—The pancreas has been found abnormally divided, with the duct of Wirsung, only, left to connect the parts; the division mostly occurring at the points crossed by vessels. The anomaly may well have been congenital.

Congenitally, also, occurs the accessory pancreas, always located between the coats of the alimentary canal, between the cardiac end of the stomach and the last loop but one of the ileum; usually in the upper portion of the small intestine and frequently opening on its mucous surface by a small duct and papilla. These accessories vary from the size of a pea to that of an English half crown piece. They appear like swellings in the wall of the gut, showing the glandular structure, on minute examination. Sometimes they are located at the extremity of a true diverticulum, or pocket, in the wall of the gut.

The last of the congenital anomalies, is the presence, in the substance of the pancreas, of a small accessory spleen, according to Rokitansky, a not uncommon object observable in the head of the gland. It has also been found in its tail.

Foreign Bodies in the Duct.—The presence of the round worm, *ascaris lumbricoides*, is the only known case of extraneous bodies here found. In one instance, the gall-ducts high up in the liver, were simultaneously invaded. This is doubtless a post-mortem event, medically unimportant.

PHYSIOLOGY OF THE PANCREAS.

Physiology.—The pancreas secretes a clear, colorless fluid which bears a strong resemblance to the saliva. It is found to differ from that fluid, however, first: in containing nearly double the amount of solid residuum, in which albumen and

casein are abundant, while in saliva they exist in very small quantities; second, saliva contains sulpho-cyanide of potassium, while in the pancreatic fluid there is none. Both fluids usually present an alkaline reaction, both containing varying proportions of salts of soda, potassa, and lime. The chemical composition of pancreatic juice is given by Bidder and Schmidt, as follows:

Water,	900.76
Organic Matter, (pancreatin),	90.38
Chloride of Sodium,	7.36
Free Soda,	0.32
Phosphate of Soda,	0.45
Sulphate of Soda	0.10
Sulphate of Potassa,	0.02
Combinations of Lime,	0.54
Magnesia,	0.05
Oxide of Iron,	0.02
	<hr/>
	1000.00

As might be inferred from similarity of composition, the pancreatic fluid serves to continue and complete the process of conversion of amylaceous or starchy foods into sugar, after they have passed into the intestines.

From carefully conducted experiments of Bernard, it appears that the pancreatic juice performs another and important function in the digestive process, viz.: that of emulsifying fat, and thus preparing it for absorption. It is well known that fat enters the duodenum from the stomach, unchanged, except that it is melted and set free from the dissolved animal tissue. Becoming mixed with bile and pancreatic juice, it is soon converted into an emulsion, giving the characteristic milky color to the chyle, and brought into a condition capable of being taken up by the lacteals.

That this power of forming an emulsion of fats is connected more with the pancreatic juice than with the bile, is shown, first; by treating fat with these fluids separately,

outside of the body, when the emulsion formed with bile will be found much less complete and permanent than when formed with the pancreatic juice; second, observations on the rabbit, where the pancreatic duct opens into the intestine some ten inches below the opening of the bile duct, show conclusively that emulsification of fats is very incomplete until after the admixture of the pancreatic juice; and third, ligation of the duct of the pancreas in an animal, and some forms of disease of the gland in man, are followed by the distinct appearance of fats in the lower intestines, and in the stools.

Hyperæmia of the pancreas is physiologically present during digestion, it being then turgid with both blood and secretion; even its venous blood is bright red and arterial in quality, although dark in the intervals of that function. Pathologically, venous hyperæmia results from vascular obstruction as in diseases of the heart, lungs or liver; and there results, as usual, hyperplasia of the interstitial connective tissue; sometimes followed by contraction and organic atrophy.

Anæmia of the pancreas may be only a part of a general anæmia, as after hæmorrhage, or from any other cause; or it may occur through obstruction of its arterial supply. Physiologically the gland is anæmic during fasting.

CHAPTER II.

PANCREATITIS—ACUTE AND CHRONIC.

The characteristics of pancreatic diseases are apprehended with the greatest difficulty. Nevertheless, this general remark may be made, by way of encouragement, that in all cases a proper knowledge of possible symptoms thereof will include the pancreas among the organs to be placed under suspicion; while a due use of the method of exclusion, by which these other organs are determined to be healthy, will sometimes devolve upon the pancreas the responsibility of originating the symptoms. Lastly, however, several of these organs and tissues may suffer simultaneously; hence, the existence of other diseases does not preclude the presence of pancreatic disorder, which should still be held as possible, and pancreatic disease does not negative other organs.

In autopsies, its examination should never be neglected.

Reserving a general resume for the end, we proceed now to the individual forms of pancreatic affection.

ACUTE INFLAMMATION OF THE PANCREAS.

Inflammation of the pancreas exists in both the acute and chronic forms, and may affect the ducts, the cells and acini, or the connective tissue.

Acute Pancreatitis may be either primary or secondary; that is, it may occur *ab initio*, or by extension, or by metastasis, or it may form part of a more general affection, as the

acute infectious diseases, so-called, by the Germans, in which are included malarial, typhoid, and other fevers; and in which the liver, spleen, kidneys and other tissues are more or less concerned in a like process. In addition may be named the catarrhal inflammation, the hæmorrhagic, the purulent, the simple metastatic and the pyæmic; six forms being defined, probably referable to two or three original types.

1. The first is the catarrhal; it usually begins with duodenitis.

2. The second is called parenchymatous degeneration, but is strictly an inflammation in which the gland-cells are distinctly concerned; these being found, on section of the red-dened and enlarged gland, so distended and opaque as to defy definition under the microscope. The tendency is to acute fatty degeneration, the cell-protoplasm being found, even early, granular in appearance, obscuring their other contents. However, by adding the solvents, acetic acid, then solution of potash, this granulation, composed as it is of fatty particles enveloped in albumen, is cleared up and the inflammatory multiplication of the nuclei is made visible; from two to five of these being found in each affected cell, with their nucleoli. This is a type of this kind of inflammation in general. The old "neuro-vascular pathology," probably applies here, hyperæmia being concomitant. The recognition of this, the so-called acute parenchymatous pancreatitis, is almost complete, with the mere presence of an acute infectious disease, also so-called (*i. e.* a "specific fever"), and with swelling of the liver and spleen, affording evidence of a like gland-cell inflammation in these organs; and in extreme cases, albuminuria, consequent on a similar process in the gland cells of the kidney. Parenchymatous pancreatitis

is the ordinary associate of these.* The same is also found in the muscular system, in such cases. Frerichs, in discussing acute yellow atrophy of the liver, advocates the similarity of these several processes, and considers that typhoid fever, in particular, presents this condition in a moderate form. Poisoning by Arsenic or Phosphorus produces a similar cell-change, as well as many like symptoms during life. Pyæmia causes a like alteration, added to its deposits of its puruloid matter. The jaundice often attending these various diseases may, possibly, according to Friedreich, sometimes arise from compression of the gall-duct by the swelled head of the pancreas, and not alone by catarrhal tumefaction of the duct itself. Jaundice, in its several forms, should always raise the question of pancreas-disease. Here we have, then, a common but scarcely thought of, form of inflammation of the pancreas. The cure of the total disease by Homœopathic remedies, given versus the symptoms, has been often accomplished, without doubt, in the absence of even a suspicion of this point in fever-pathology, just as in thousands of other conditions.

3. The third form of acute pancreatitis is the hæmorrhagic, which must not be confounded with pancreatic apoplexy, to which reference has yet to be made.

The known cases number but few as yet, only those of Læschner and Oppolzer being quoted by Friedreich. The latter occurred in a previously healthy man, proving fatal within a few days; beginning with violent cardialgia, which steadily increased; vomiting came on, with frequent evacuation of bile-like matter; constipation; great aggravation of pain by pressure on the epigastrium; high fever; then deathly pallor, great restlessness, and frequent faintings, collapse, death. The pancreas was found trebled in size,

*Friedreich, in Ziemssen's *Cyclopædia*; vol 8, p. 596.

surrounded by extravasated blood, and with extravasation in the acini of the gland. The other case supervened upon an old gastric (?) disorder, in a man of twenty-six years, addicted to the excessive use of tobacco and liquor. The symptoms were like those of Oppolzer's case, but the fever was slight; the pain was at first like colic in the upper abdomen, then a continuous, agonizing burning, with great anxiety, nausea and vomiting without relief. Then the upper abdomen became distended and hot, with shooting or drawing pains, violent, continuous, and greatest along the greater curvature of the stomach, but shooting to the duodenum, to the spleen, to the navel, and upward toward the scapula; persistent constipation; constant thirst; moist, thickly coated tongue, with only a little viscid saliva; belching; headache; vertigo; cold sweat; pulse 75. Collapse was imminent, and, finally, after a few days, the extremities becoming very cold, this event occurred, and death ensued.

The autopsy showed the head of the pancreas dark red, livid, and here and there infiltrated with blood. The mucous membrane of Wirsung's duct was darkly reddened, and in the head of the gland were small exudations, yellowish and finely granular. Catarrhal or croupous inflammation is suggested by these appearances, as perhaps the initial stage of the hæmorrhagic. The former case appears more like the parenchymatous form.

4. The fourth form is purulent pancreatitis. There are also two cases of this kind quoted by Friedreich; the symptoms differ very little from these last, and one is led to suppose a similar beginning. One of the subjects was a man of sixty-three years, an old dyspeptic, often vomiting, cachectic. He ejected, now, a thin stained fluid. Death occurred by acute collapse. A large abscess, involving the pancreas, was found behind the stomach, with three perforations as large

as peas in its posterior wall; the cavity extending backwards to the spine, and to the pylorus and spleen. The pancreas itself was grayish, discolored, flaccid, and extensively infiltrated with pus.

The other patient was a strong man of forty years, who was suddenly seized with symptoms of acute peritonitis, without known cause. The abdomen was very painful, worse on moving; tongue dry; high fever; constipation; great meteorism and tension; elevation of the diaphragm; dyspnœa; belching; bilious vomiting.

The autopsy revealed general peritonitis, greatest above, with sero-purulent exudation, matting the organs together. The pancreas was the seat of a multitude of little abscesses, many of which had burst into the peritoneal cavity, thus developing the fatal peritonitis. Atelectasis of both lower pulmonary lobes had also supervened.

Our late colleague, Dr. H. E. Reinhold, of Williamsport Pa., succumbed to a not strictly treated intermittent fever, of irregular type latterly, with severe twitching of the muscles of the neck, etc., especially during exacerbations. The autopsy showed multiple pancreatic abscess; probably founded on a typical febrile parenchymatous inflammation, aggravated by the use of the combined alkaloids of cinchona.

In the future, we should suspect in malarial fever which has become chronic and irregular, that such changes may have occurred. All these cases happened in males, but Schœnlein and Mondiere regard menstruation and pregnancy as capable of promoting acute pancreatitis, and they are known promoters of parenchymatous inflammation. Analogy dictates that such cases are to be assimilated with the second form. Trauma is another of the possible causes.

5. The fifth, or metastatic form, is that which seems to be possible, in the course of parotitis, thus comparable with

the same process occurring in mumps, in the testes, the mammae, labia majora, etc. Friedreich refers to several apparent cases, with no little reservation, however; but one, a syphilitic woman with parotitis, was first violently salivated, and was seized, on the subsidence of this, with symptoms of acute pancreatitis, with copious diarrhoea. The stools, about thirty per day, were yellowish, watery, and like saliva. This also ceased, and suddenly, at night, both parotids swelled, without salivation. Collapse came on and she died. The pancreas was found swollen, reddened, very full of blood, and indurated; both parotids were inflamed; there was a little serum in the pleural cavities; other organs healthy. The possibility of such metastases is thus made pretty evident, but Friedreich rejects the notion of functional sympathy between the pancreas and the salivary glands.

6. The sixth and last form of acute pancreatitis is the pyæmic. It is to be inferred, if symptoms such as those described come on during an attack of puerperal fever, or of pyæmia; as the conclusion is then probable, that pyæmic foci have been formed in this gland. But the much less tumultuous second form will probably, in some degree, occur in all cases of pyæmic fever as of other "acute infectious diseases," as before said; simultaneously with like changes in the liver and spleen.

Sub-acute Pancreatitis is allowed by Friedreich, as a transition to the chronic condition. The possibility of implication of the supra-renal capsules and solar plexus, in panereatic disease, is a most important matter for the physician to consider, and this involvement of the plexus may explain, through cardiac paralysis, the sudden death repeatedly occurring in such cases. No case of sudden death, indeed, can be considered as fully investigated until this organ has been

attended to. In chronic cases, Addison's disease may ensue, with its characteristic bronzing of the skin, etc.

CHRONIC INFLAMMATION OF THE PANCREAS.

Chronic Pancreatitis.—Owing to the loose use of descriptive terms, the older cases of this kind are in doubt; the post-mortem traits of the normal gland also being somewhat undefined, and the variations arbitrarily estimated; mere chronic inflammation and induration being often called scirrhus, or steatoma; and normal glands being pronounced indurated, etc. Later cases are yet few, but afford the basis for a more careful study in the future, having been well observed and recorded.

As in the acute, so in chronic inflammation, indeed, in all forms of pancreatic lesion, we have first to consider peripancreatic disease; thus of the retro-peritoneal lymphatic glands, connective tissue, blood-vessels, nerves, abscess, degeneration, hæmorrhage, etc.; and secondly, to estimate the effect of extension of disease from these to the pancreas; thirdly, on the contrary, the effect of pancreatic disease on these parts; and fourthly, the pathological relation subsisting between the gland and the peritoneum; a simple allusion to these will be sufficient; fifthly and lastly, the physiological and pathological relations subsisting between the pancreas and other viscera of the upper abdomen. A resume of these is reserved for the end.

It is in chronic pancreatic disease that these questions become most interesting as well as puzzling; the ætiology of even such diseases as diabetes mellitus, and Addison's (bronze) disease, being developed in some cases; while dyspepsia, etc., must often involve this gland.

Three principal kinds of chronic pancreatitis may be con-

sidered, viz.: the catarrhal, the parenchymatous, and the interstitial. The term parenchymatous inflammation, already introduced in describing acute pancreatitis, and constantly in use by the German pathologists, it will be remembered, is not applied exactly as of old; it now signifying a pathological irritative multiplication of the cellular elements of a part, as distinguished from a similar increase of its interstitial framework, and of the connective-tissue corpuscles which are its living elements. (Vide acute pancreatitis.)

Chronic Parenchymatous Pancreatitis.—In the case of the pancreas, parenchymatous inflammation concerns the secreting gland-cells gathered in acini between the ramifications of its fine ducts.* These cells swell, their nuclei multiply by division, the cells develop, and the gland enlarges, wholly or in part; subject, afterwards, to the various processes of degeneration, fatty, and other, so common in newly-formed tissues of some duration.

As in other cases of parenchymatous inflammation, this form of pancreatitis is apt, as time advances, to be complicated with more or less inflammation of the framework—i. e., with interstitial inflammation. For the sake of clearness, however, it will here be considered as if entirely distinct.

What effect does parenchymatous inflammation of this gland produce on its functions, what symptoms characterize it? In the acute form, some sort of answer can be returned to this question, but in the chronic form, the greatest uncertainty exists, since its functions are so little exclusive, its situation so deep, its symptoms so dubious, in the present state of our information. A knowledge of antecedent causes, however facilitates this. The principal of these causes is, perhaps alcoholism; another is tobacco smoking; to which

*Kuss' Physiology, loc. cit.

we may add old fevers and specific taints, as scrofulosis and syphilis. The drunkard's pancreas, however, does not present this condition simply. True, the gland-cells, according to Friedreich, have been found proliferated, multiplied, and with increased number of nuclei, as above described; but besides the interstitial connective tissue may be greatly increased, forming a large, indurated, nodulated mass; in short, cirrlosed, along with cirrhotic liver, kidneys and heart. The cells of the pancreas showed, in the case quoted, however, no sign of fatty degeneration, as might have been expected, and no symptoms during life led to the suspicion of disease of this gland; although gastric catarrh, asthenia, and dropsy were present. The later digestive functions ought to be specifically considered in such cases.

As the sequel of old and maltreated fevers, this inflammation may well appear; but no facts are as yet forthcoming on the point, if we except that of Dr. R's case. Scrofulous pancreas and syphilitic pancreas will be separately mentioned.

Chronic Interstitial Pancreatitis.—Inflammation of the interstitial connective tissue frame-work of this gland, as in other organs, usually occurs more or less at the expense of the parenchyma, or proper cell-structure, sometimes even to its destruction, by encroachment, by pressure, by starvation of blood-supply, and thus by simple atrophy, or by fatty or cheesy degeneration; the organ, in chronic cases, at first enlarged and indurated, becomes contracted, irregularly; in other words, cirrlosed; and the causes are analogous with those by which the liver and kidneys are similarly destroyed. Microscopically, the connective-tissue corpuscles multiply by division, their fibrous processes extend and increase, the whole frame-work thereby thickens; the young and succu-

lent tissue thus formed becomes more solid, and gradually contracts, as does the similar, cicatricial tissue; the gland-cells perish by fatty change; the organ becomes nodulated and indurated, until the cirrhosis is complete; sometimes causing the appearance, and even the erroneous appellation of steatoma, or of scirrhus. Glandular atrophy is the proper designation of extreme states of this kind. Such a pancreas has not infrequently been found, after death from diabetes mellitus; to which allusion will again be made.

Primary cases are confessedly rare; secondary cases, less so. Of the latter there are two principal causes known, viz.: first, the venous congestive, due to primary lung, heart, or liver diseases; and second, the obstructive, or retentive, depending on the closure of the duct of Wirsung, by whatever cause, as concretion, tumor, etc., etc., with retention of secretion, and resulting inflammation.

The former condition, the congestive, existing, the probability is considerable, that all organs from which the outflow of blood can be thereby retarded, and backflow induced, will undergo, naturally, the cirrhotic change, except so far as the engorged vessels relieve themselves by serous or dropsical exudation.

In these congestive cases, the structure and function of the gland suffer but slightly. If retentive causes operate, the result is more pronounced. Here, the pressure of the confined secretion creates resistant nutrition of the connective tissue, and cirrhosis thus occurs; often varied by the gradual yielding of one or more points of the duct system, and the consequent formation of cysts, sometimes containing pus, blood, etc. Induration is the general result, however, here and in the first form.

In either case the gland may present on examination, in

addition, various changes of later date; thus, its nodular portions, on incision, may be found to contain hæmorrhagic, or, if old, pigmentary deposits; or fatty matter, the debris of the starved gland-cells; or chalky substance, the later residue left by the resorption of such debris.

The existence of cirrhotic disease (sclerosis) in other organs is sufficient to raise the question of this form of pancreatitis being also present during life.

Symptomatology of the two forms.—The symptoms of parenchymatous pancreatitis, like those of other glands in a like state, *e. g.* the kidneys—ought to present a scanty, condensed, but inert secretion, and complaints during late, or duodenal digestion; modified or not, by the abundance or deficiency of bile, and benefitted by the use of prepared pancreatine. 2. The symptoms of chronic interstitial pancreatitis, also comparable with other glandular cirrhoses, should suggest a somewhat copious, but gradually weakening secretion; with slowly progressive dyspepsia; looseness of the bowels, some time after eating, and fatty stools.

In both cases, indeed, fatty matters should be looked for in the stools, increasing as time advances; and diabetes mellitus is always to be inquired after, if the symptoms indicate pancreatic disease of any duration; both of these symptoms being frequently found, owing to indigestion by this organ of the several forms of hydro-carbon, *viz.*: the starchy or saccharine, and the fatty.

Partial or limited cirrhosis may occur in the head of the pancreas; less often in the body; rarely in the tail.*

The *tout ensemble* of primary chronic pancreatitis, however, remains very uncertain; first, as to the knowledge whether

*Cirrhosis of the tail of the pancreas, with valvular heart disease, existed in the person of our late lamented colleague, Dr. David James. He suffered from paroxysmal pains, referred by himself to the transverse colon.

the gland is diseased at all; second, whether mere inflammatory, or some other lesion exists, as cancer. A typical inflammatory picture would be as follows: the previous abuse of alcohol, tobacco, mercury, quinia; old and maltreated malarial or other fever; followed by fatty stools, oily or saccharine urine, with deep-seated, dorsal-epigastric pain; neuralgia; a deep-seated, transverse swelling, tender on pressure; subsequent implication of the biliary duct, or vena porta, or vena cava, with obstruction of either, and consequent jaundice, or dropsy of the abdomen or legs; or disease of the pylorus or duodenum, with progressive regurgitation or vomiting of food (blood, pus, if suppurative). These symptoms, appearing in such order, may well mean primary inflammatory pancreatic disease; a reverse order would imply secondary extension from other inflamed organs, as the liver or intestine.

CHAPTER III.

PANCREATIC DISEASES.—CONTINUED.

FATTY PANCREAS.

Fatty change of organs occurs in three forms, viz.: first by cell infiltration, the fat being derived, first, from the excess of hydrocarbon in the food, and, secondly, from metastasis of fatty products of disease; also, by fat-cell proliferation (“multiplication by division,”) also lipomatosis, locally so-called; obesity, when general and systemic; these fat cells are only specialized connective tissue cells; thirdly, by cell-degeneration, the product being oily or fatty, usually the result of, first, loss of nutrient supplies; secondly, decomposition of albuminous protoplasm of the cells, by oxidation, often widespread and rapid, as in fevers and phthisis, but incomplete, the product being a transition material, oil or fat.

For obvious reasons, two or more of these changes may co-exist. Thus, lipomatosis of the pancreas frame-work encroaches on its secreting acini, destroying the cells by simple atrophy or by fatty degeneration, the duct of Wirsung only of the whole gland-structure remaining intact. This duct to contain a fatty, whey-like fluid, is found in such cases. Similar changes usually co-exist in the heart, liver, omentum, etc., along with general obesity, especially in drunkards.

Fatty degeneration in the pancreas, just as elsewhere, is the most important element of fatty disease.

The earliest microscopical appearance is granulation of the cell-protoplasm. This is due to the decomposition of particles of the albuminous matter, forming a microscopic oil-globule; these particles being each enveloped in a pellicle of unaltered albuminous matter, which envelop dissolves in either acetic acid or alkalies, the oily particle itself best dissolving in ether; all of which tests may be applied under the microscope. These granules, in the advance of degeneration, enlarge, become more plainly oily, then coalesce, hiding the nucleus. (Fatty infiltration rather pushes the nucleus toward the periphery of the cell, thus obscuring it). Lastly, the cell perishes, and only fatty detritus, in emulsion, if the pancreas remains; sometimes filling and even distending the ducts. This is also typical parenchymatous degeneration.

The acinous contour is retained, until these contents are absorbed or discharged, when atrophy gradually appears. If interstitial new growth, from chronic inflammation, be also present, a contracted, tough, indurated body results; if not, it appears soft, flaccid and wasted.

One of the important features of fatty degeneration, here as elsewhere, is the frequent involvement of the walls of the bloodvessels, in which case hæmorrhages are apt to occur. In drunkards, especially, and in abnormal corpulency, these changes are of great moment, as they are, as to the heart-muscle, in similar subjects (vide pancreatic hæmorrhages).

AMYLOID PANCREAS.

This condition is only a fractional part of a general tissue degeneration, which finds its first location in the walls of the smaller arteries; thence extending to the cellular elements of organs, and finally involving all the tissues in its

vicinity; forming a waxy, or bacon-like, firm mass; hence, the synonyms, waxy, or lardaceous degeneration, or, as some contend, infiltration; albuminoid is another term sometimes used, meaning that the abnormal matter is nitrogenous, not any form of mere hydro-carbon. All these phrases, indeed, express the theoretical views of authors; Virchow supposing the abnormal substance to be a sort of animal starch, (amyloid) or of cellulose, and so on.

The liver, spleen, and kidneys are most commonly simultaneously affected; are greatly and progressively enlarged, become firm, and lose their function. The intestinal blood-vessels and other tissues participate, causing a form of ulceration, and chronic diarrhœa.

Its causes are found in all debilitating diseases, as bone-caries, phthisis, and above all, syphilis. It is more common at least in its earlier form, than is usually believed; only microscopic observation, or the iodine test, revealing it by its brown stain,* etc.

By interference with adjacent nutrition, fatty degeneration becomes an occasional concomitant. Thus Friedreich describes a case of phthisis, with amyloid degeneration of the pancreatic vessels, and fatty degeneration of the gland-cells; the latter being favored, doubtless, by febrile processes, as in some other cases.

PANCREATIC APOPLEXY (PANCREATIC HÆMORRHAGE).

This event is naturally secondary to other and somewhat varied lesions. Organic disease of the heart, of the lungs, or of the liver, inducing chronic congestion of the gland, causing inflammatory changes, then fatty degeneration;

* Iodine stains normal tissues yellow. The brown stain commonly turns to violet, by adding strong sulphuric acid.

these are prominent antecedents of hæmorrhage. However, according to Klebs, diffuse hæmorrhage sometimes occurs, quite independently of all these; the gland being found red, the acini gray, or pigmented. Three cases reported by Zenker, and recorded in Friedreich's essay in Ziemssen's *Cyclopædia*, Vol. VIII., occurred in corpulent persons, one of whom was a drunkard, also; showing that whilst emaciation was of old held to be diagnostic of pancreatic disease, we must now recognize obesity also, as connected with some forms; perhaps causing them, even, by primary interstitial lipomatoses of the gland; secondary fatty degeneration of acini and bloodvessels, due to pressure, and local anæmia following; and finally, rupture of the vessels, with extravasation of blood. Either extreme emaciation or obesity, along with the other symptoms, may then look toward pancreatic diseases; in the former case, after digestive distresses; in the latter, with or without these, anæmia or asthenia often co-existing, as is by no means rare in corpulency.

In Zenker's cases, indeed, the corpulency was not extreme, yet Friedreich regards them in the above light. Kleb's case he excludes from this type. Sudden death happened in all, notwithstanding the loss of blood was not great; wherefore the question, why did they die? The most satisfactory reason is that which refers it to the proximity of the solar plexus and its branches, and to the shock and pressure thus suffered, and propagated to, and paralyzing the heart; a condition also illustrated in Goltz's tapping experiment (*Klopfversuch*), in which, by tapping on the abdomen of a frog, the heart is paralyzed, and action arrested at its diastole. In one case, there was great venous engorgement of the solar plexus. At all events, we hence derive an important clinical lesson, viz.: to always suspect the pancreas in

cases of sudden death, and prominently, hæmorrhage. Again, we are warned against careless percussion over this region, in depressed cases. I have myself seen collapse symptoms thus occur. The blood may be effused either into or around the gland, or both. It may happen without warning, in the midst of apparently perfect health; or with malaise, inclination to vomit, etc.; or in persons suffering from chronic alcoholism (with cirrhosis, hæmorrhage, and cystic expansion).

If death be postponed, the peritoneum may suffer, and sloughs be formed, discharging into its cavity, as in Klebs' case; of course with secondary peritonitis. Or again, a pulsating tumor may develop, with violent (bilious?) vomiting, diarrhœa, great distress, palpitation, cold extremities, faintings; the symptoms fluctuating, for months, perhaps, until, during an exacerbation, death ensues. Such a case was that of Stœrk, mentioned by Friedreich; the first attack occurred during the menses, in a woman of twenty-eight years; these immediately ceased, and death followed in three and a half months. The autopsy showed the pancreas converted into a blood-cyst, weighing thirteen pounds; a ruptured bloodvessel communicated with it, at the middle of the gland.

Besides these greater hæmorrhages, others may be found: as, first, hæmorrhagic spots scattered through inflammatory or new-formed connective tissue; degenerating into oval pigmented masses, or cyst-like "spaces containing a colored serosity, and surrounded by thickened, irregular, rust-colored walls;" secondly, ordinary retention-cysts, with hæmorrhagic contents. Diseases of venous obstruction (of heart, lungs, etc.), are connected with the former; obstruction of Wirsung's duct, with the latter. But the apoplectic cases

proper, the greater hæmorrhages, seem to be more closely identified with diseases of the solar plexus.

Blood thus extravasated sometimes finds its way into the duodenum, and may be both vomited, and passed per anum. Pepper's case, quoted by Friedreich, died in this way; being a drunkard, with cirrhotic liver, and hæmorrhagic cysts of the pancreas. Hæmorrhagic, as well as other cysts, may also adhere to, and discharge by, the stomach and bowels.

CONCRETIONS IN THE PANCREAS.

These occur in the duct and its branches, even to the smallest, and are of two kinds, viz.: proteinaceous and calcareous. Incrustations may form in the duct, but commonly they assume the form of stones, of dimensions varying from the microscopic to the size of a walnut. Often they are multiple, even numerous.

Virchow described the proteinaceous concretions as microscopic, solid and insoluble; they were found in a syphilitic woman. The calcareous forms consist of carbonate and phosphate of lime; the larger sometimes showing cavities containing smaller calculi, or chalky powder, with milk-like fluid, as if included by accumulated surrounding incrustations. Sometimes cancer co-exists, either in the gland itself, or in neighboring organs, as the stomach.

The causes of such concretions are similar to those elsewhere observed: first, the nature of the food and drink used, must always be taken into account; secondly, the presence of particles capable of becoming the nuclei or nidus of deposit, *e. g.*, the solidified, glassy, proteinaceous, microscopic concretions of Virchow; or blood, or catarrhal matter proceeding from inflammatory exudation, may become nuclei for large calculi; thirdly, inflammatory deposits, containing lime-

salts, which remain after absorption of the organic matter; fourthly, chemical precipitation of the inorganic matters, especially lime; of the pancreatic secretions, upon and into the mucous epithelium of the ducts, in which case the carbonic acid of the blood, which is believed to hold them, normally, in solution, probably escapes; perhaps aided by the superior affinity for lime, of the phosphoric acid of associated alkaline phosphates, thus forming phosphate of lime; or, again, the pancreas being known as the one organ which can and does decompose fats into glycerine and fatty acids, it may be that these nascent acids form insoluble fat-salts of lime, sometimes to be further oxidized, and changed to its equally insoluble carbonate; fifthly, in diseases of bones, metastases of lime-salts to various parts of the body are common, and the pancreatic secretion may be affected thus, and concretions form therein; sixthly, constitutional vices may determine a degenerative nutrition, simultaneously in various tissues and organs, including this. Thus, syphilis may involve the aorta in atheroma, ending in calcification; along with pancreatic disease, probably of similar nature and origin. Such a case recently occurred in the clinic of Prof. Wm. Pepper, of Philadelphia, causing jaundice, with diabetes mellitus, albuminuria, and death, with symptoms of blood-poisoning (cholæmia, or uræmia?). Post mortem, the common gall-duct and pancreatic-duct were both found impervious, owing to pancreatic concretion; and both the gall-bladder and the duct of Wirsung were so distended as to form large fluctuating tumors, felt during life; diagnosis having been reserved as to a possible cancerous obstruction, the autopsy showed it to be purely concretionary. The aortic disease, diagnosed in life, was attributed to constitutional syphilis of nine years' standing, and the pancreatic affection

was considered as part of the same. Henceforth, this vice should be sufficient to turn attention to this gland in obscure cases, and to this form of lesion among others.

The results of pancreatic concretions are suggested by the symptoms of this case. We may have obstruction of one or both of the companion ducts; the loss of the functions of the affected gland; formation of retention-cysts in the course of the duct of Wirsung, which may reach even to the size of a child's head, forming a fluctuating tumor in the epigastrium; distention of the gall-bladder; jaundice; diabetes mellitus, to which allusion will be again made, as a frequent attendant on pancreas-diseases; pressure on surrounding parts, with possible injury; atrophy and destruction of the gland-tissue itself. (The German pathologists apply the term *ranula pancreatica* to the enlargements caused by obstruction of the pancreatic duct, comparing it with that tumor which forms beneath the tongue from obstruction of Wharton's duct of the submaxillary gland.) Inflammation of the gland may result, and we have pancreatitis or perip pancreatitis; fatty stools and lientery from failure of the pancreatic secretion and digestion, with or without the failure of the assisting emulsifier, the bile; aneurism of the aorta,* above the pancreas, with contraction of the same below caused by pressure, and causing circulatory disturbances, etc., in the dependent parts; pressure on the vena cava, or vena porta, with obstruction, dropsy, etc., also, when there is solid pressure; pressure on, and irritation of the solar plexus of nerves, with vaso-motor, cardiac, and other troubles; or, we may have from extension of inflammation, the involvement of the plexus, the supra-renal capsules, etc., as in Addison's disease. All other lesions of the

* Only if connected with solid growth and pressure.

pancreas, however, may be considered in such cases, as well as, or even more than concretions, since proximity renders all these parts liable to their influence. Again, it should be remembered that pancreatic concretions are sometimes associated with other lesions, as cancer, either of the gland itself, or of some neighboring organ, as the stomach; or with aortic calcification.

CYSTS OF THE PANCREAS.

Incidentally, these have been considered along with concretions. Retention-cysts may occur, however, in other ways, as by inflammation of the interstitial connective tissue forming a simple stricture of the duct; or by catarrhal obstruction of the duodenal opening of the duct; thus, from catarrhal duodenitis; a history of such an affection, with or without jaundice, as antecedent to this lesion, may greatly simplify the diagnosis. Again, obstruction may follow local peritonitis (peripancreatitis), with adhesions and indurations; or new growths in the head of the gland; biliary calculi in the common gall-duct, pressing on the canal of Wirsung; tumors in neighboring parts, enlarged lymph-glands, etc. Not only may the main duct of the gland be obstructed, but like causes may induce obstruction of smaller ducts, and then the cysts are small and multiple, forming vesicles, sometimes looking like a bunch of currants. Retention-cysts may become hæmorrhagic within.

Furthermore, cysts are sometimes hæmorrhagic in origin; and all hæmorrhagic cysts may be found containing either blood, or after a season, only hæmatoidin, owing to the absorption of the other constituents, and alteration of its hæmatine. Concerning such hæmorrhages, more anon.

The bursting of cysts may cause shock, peritonitis, and speedy death; and this organ should be examined carefully, in doubtful cases. Fatal cases of circumscribed hæmorrhage without bursting, are also recorded. (Vide hæmorrhage of the pancreas.)

Only when pretty large can cysts be fully made out during life; the appearance of a tumor deep in the region of the gland, roundish or oval, smooth, soft and fluctuating, with antecedents such as have already been mentioned, would justify the guarded conclusion.

HYPERTROPHY OF THE PANCREAS.

Hypertrophy of the pancreas, so-called, is found as a consequence of chronic inflammation, increasing the connective tissue frame-work; but the term pseudo-hypertrophy is more correct, inasmuch as this term is thus applied elsewhere (muscles), and there is no new formation of gland tissue proper, so far as is now known. The normal size and weight of the gland, moreover, so necessary to the determination of pathological variations, is still undefined.

ATROPHY OF THE PANCREAS.

Owing to interference with its circulation, the gland may suffer atrophy. The principal causes of such interference are found in diseases of the heart, lungs, and liver, by which its veins are chronically congested, cell-nutrition impaired, and connective tissue increased.

Obstructions to Wirsung's duct by calculi, or otherwise, with retention of its secretion, occur at the sacrifice of the cellular elements thus pressed upon. Fatty degeneration usually occurs in the cells, in the process of atrophy. The

typical effects of pancreatic atrophy are seen in fatty stools and diabetes mellitus.

MORBID GROWTHS IN THE PANCREAS.

These are of three principal kinds, viz.: tubercle, carcinoma, and sarcoma.

Tubercle is very rare; and cases so-called have most commonly been, not true or gray tubercle, but of the spurious sort—the yellow, caseous, degenerate product of inflammatory exudation; usually, the true is also more or less old and cheesy, and is found in connection with pulmonary and intestinal phthisis. The symptoms, therefore, are not very definite, so far as observed. It must be remembered that true tubercle anywhere is strictly a new growth, destitute of vessels. The most frequent form of pancreatic new growth is carcinoma. Not only so, but of all primary diseases of this gland, it is the most frequently detected during life, and so apparently the most common. On the other hand, chronic inflammatory induration was by the older physicians often mistaken for it, post mortem; and even in cancerous patients themselves, this is relatively rare; according to Willigk, only twenty-nine in 467 autopsies of each; according to Foerster, only six in 639, of all kinds of disease; and of the six, none were primary.

Commonly it appears as scirrhus, rarely of other varieties; and usually, the head of the gland is the part affected at first, the growth spreading from that focus. Very rarely it has been found confined to the body; still more so to the tail.

Cancer of the pancreas is far more common in men, than in women, and occurs almost altogether after forty years of age. Heredity, no doubt, as well as other factors of cancer elsewhere found, affects the ætiology, but nothing is certainly

known of it. The general impression first made upon the observer is, that some deeply-seated organic lesion exists in the upper abdomen; that is, after the incipient, functional troubles have become persistent and progressive. Symptoms of interference with the several organs of the upper abdomen are variously proportioned; then, they suffer by direct implication in the growth, or, at least, by pressure; as, the thoracic duct, the common gall-duct, one or both ureters, the duodenum and pylorus, the bloodvessels, etc., as already mentioned under cysts, and far more conspicuously than with cysts. Thus, gastric, or hepatic, or other disease, is often suggested by the symptoms; watery vomiting, great thirst, moist tongue, and emaciation, being specified by some, as characteristic symptoms; on insufficient grounds, perhaps, yet of thirty-seven cases mentioned by Da Costa, dyspeptic symptoms existed in twenty-five; vomiting, from concomitant gastric disease in twenty-two; whilst twenty-four had jaundice; fifteen, dropsy; nineteen, obstructed bowels; and fifteen, alternate constipation and diarrhœa.

Pain is of particular importance; Da Costa's statistics show thirty-two cases of special severity. It is neuralgic, involving the branches of the cœliac plexus; deep in the epigastrium, sometimes going crosswise, or running to either hypochondrium, usually the right; or to the shoulder, or the back, or sacrum; or over the whole abdomen; often aggravated by the upright posture; better by forward flexion.

Tumor, usually roundish and nodulated, if found, is an important sign; but it has been inappreciable by the hand, in at least two-thirds of the actual cases. Since the head of the gland, the most frequent location of cancer, lies concealed by the liver, there is great difficulty in feeling it, until it has grown considerably. Sometimes a mere increase of firm-

ness and resistance, indicates its possible presence, but the same sort of quality is presented by cancer of the omentum; whilst cancer of the liver, or stomach, with their more definite nodulation, is liable to be confounded with it also. Epigastric tumors, however, are always to suggest a full examination of this organ, both functionally and anatomically. Along with cancer, enlarged cervical lymph-glands may be found; likewise cancerous cachexia, fatty stools, and saccharine urine. In the advanced stage of the urinary error, catarrhal nephritis and albuminuria may be set up by the irritation of the kidneys, as in other cases of diabetes.

The duodenum, or pylorus, very rarely the cardiac end of the stomach, or even its body, may suffer from pressure; obstruction, with its usual consequences, may ensue; dilatation above the obstruction, and imperviousness to the passage of food or drink beyond it, vomiting of food, etc. Pressure on the colon causes constipation. Mere pressure on a ureter has caused hydro-nephrosis; on the bile-duct, jaundice; on the duct of this gland itself, ranula, cysts or concretions. If on the mesenteric vessels, vascular errors in the bowels, with secretory and other lesions; on the splenic vessels, alterations in size of the spleen, and of its blood-making function. If the vena porta be compressed, ascites results; if the vena cava, which is more frequent, œdema of the lower limbs; if the aorta, real or spurious aneurism may appear.

Further, the original pancreatic cancer may spread to other parts; and still further, other cancers may spread to the pancreas, defying us to trace their origin, even by autopsy. Here, the steps of the history, the date of appearance of fatty stools, of saccharine urine, etc., with the antecedent and subsequent phenomena, may give the needed clue. Pancreatic cancer sometimes ulcerates into the gut; as

also into arteries of the stomach or spleen, the vena porta or vena cava, with evident results; or through the peritoneum, directly into the abdominal cavity; or even through the diaphragm into the chest. The liver, kidneys, suprarenal capsules, vertebræ, etc., may also be attacked. Not only primary pancreatic cancer, but the secondary or metastatic also, is located most commonly in the head of the gland; and this latter usually occurs by extension from the pylorus, duodenum, liver, or gall-bladder; more rarely, it is consecutive to some distant cancer, and then is isolated, distinct and circumscribed. Among the mere possibilities is mentioned the participation of the gland in a universal carcinosis, comparable with general miliary tuberculosis.

Sarcoma of the Pancreas.—The distinction of sarcoma from the innocent fibroma, and from true carcinoma, is now-a-days somewhat clearly made; sarcoma, however, is scarcely less malignant than carcinoma. There are three varieties, viz.: the fibrous, or spindle-celled, the small-celled, and the giant-celled; the first resembling in its cell-forms, young connective tissue; the second, the still more embryonic tissue of granulations; the third, is probably due to the fusion of a number of adjacent cell-walls into one, on which their several nuclei are displayed; an appearance which Gross, Jr., compares to "a tray covered with oysters on the half-shell."

A single case of sarcoma of the pancreas is recorded; it was small-celled, and was without notable symptoms during life; the young man having died of pulmonary and intestinal phthisis.

CHAPTER IV.

THE RELATION OF PANCREATIC DISEASES TO OTHER AFFECTIONS.

An important list of associated maladies may occur, either as primary or as secondary to pancreatic disease; their histories must tell us which. Again, the proximity of the gland to many important organs and appendages of organs, and likewise a common nerve and blood-supply, not only favors extension and mutual implication in disease, but renders discrimination by anatomical location and pathological dissimilarity, quite difficult. Thus, its artery is one of a group, subject to embolism, etc.; its duct is closely related to that of the liver (which sometimes even passes through the head of the gland itself), also to the duodenum, the portal, splenic and other veins, including the vena cava; the aorta, celiac and superior mesenteric arteries and their branches, being also in mechanical apposition; as are the liver, spleen, kidneys, supra-renal capsules, solar plexus of nerves, the peritoneum, the stomach, colon, and gastro-colic omentum, and the spinal column. Still further, the physiological functions and pathological errors of the gland are apparently shared by the stomach, the liver, the glands of Brunner in the duodenum; all of which can do duty for and sympathize with the pancreas, more or less, in its really numerous and complex normal and abnormal functions; hence, aside from anatomical confusion, the physiological and pathological indefiniteness is no less tantalizing.

Notwithstanding all this, its pathological conditions can

be somewhat learned by great care, in first, localizing the gland in its position; second, localizing as precisely each and all of the adjacent parts; third, observing the condition of each, structurally, as closely as possible, especially if apparently altered from the normal standard; fourth, noting the changes, if any, in the physiological working of such apparently altered organ, in particulars not shared by the pancreas, *e. g.*, the biliary function of the liver, thus establishing the existence of disease of such part, or its absence; fifth, tentatively excluding from consideration all organs not affected beyond the debatable ground of shared function, and giving this one a particular review.

Anatomically, the gland can be fairly well located by carefully noting, first, the position of the spinous process of the first lumbar vertebra, which is nearly horizontal, and lies just in the rear of the middle of the gland; second, the position of the lower border of the stomach, by percussion, as this organ sounds more clear than the space just below it (the gastro-colic omentum), but more tympanitic and less truly resonant than the transverse colon beyond, also by the distance (about four fingers' breadth) above the navel. In this position it may be sought.

RESUME.

Not to enter into the subject of diagnosis in any detail, this being assigned to able hands, it still devolves on us to consider the many symptoms and lesions which experience shows to be clinically related to pancreatic disease, and to create the questions which the diagnostician must solve. These may be classified as systemic and local; and will be here mentioned in that order, and their ætiological status referred to in passing.

The systemic affections concerned with pancreatic disease

are either causative or consequent thereto. As causes may be named:

Mental depression, producing various dynamic disorders, with evolution of tissue lesions; probably of the pancreas among others.

Alcoholism, producing inflammation, both parenchymatous and interstitial, as well as fatty degeneration of gland cells, hæmorrhage, etc.

Abuse of tobacco through the nervous system, is probably causative of pancreatic disorder, with dyspepsia.

Abuse of drugs, as Mercury, Cinchona, purgatives, etc., is mentioned among the causes by Friedreich, and is a point, doubtless, well taken.

General fatty degeneration of albuminous tissues is common enough in both acute and chronic disease attended with fever, which rapidly but imperfectly oxidizes, and so decomposes them; thus, in erysipelas, pneumonia, essential fevers, phthisis, etc., involving the pancreas as well as other parts.

Obesity may be the direct cause of lipomatosis of this gland, with consecutive glandular atrophy, etc.

The acute infectious diseases (so-called by the Germans), as the essential fevers, intermittent, remittent, typhoid, and the exanthemata. Here, a parenchymatous or cellular inflammation invades the whole organism, more or less, including the chylipoietic viscera, including the pancreas.

Onanism is mentioned as a possible cause of pancreatic disease, doubtless because of the depressing influence upon the abdominal nervous plexuses.

Amenorrhœa bears a like relation, and may be causative.

Pregnancy sometimes develops parenchymatous inflammation and degeneration of the liver, or kidneys, or both, and the pancreas has seemed to be similarly affected. Pregnant vomiting strongly suggests it.

The climacteric age is to be regarded as having similar influence.

Scrofula, a known predisposing cause of morbid activities of secretion, nutrition, etc., is to be considered among the causes in this series. Psora is comparable with this.

Syphilis, also a cause of the most varied lesions, counts among its effects, gummatous and interstitial inflammation of the pancreas, with parenchymatous or cellular fatty degeneration.

General amyloid degeneration, first of the middle coat of the small arteries, later of the parenchyma or cell structure of the whole body, mainly concerns the liver, spleen, kidneys and intestines; but the pancreas is also invaded and its secreting function destroyed. It occurs in phthisis, bone diseases and traumatic suppurations, and when any exhausting disease proves persistent, and more than all in constitutional syphilis. The occurrence of fatty stools or melituria in any such cases would point to pancreatic involvement. Enlargement of the liver and spleen, with albuminuria, after such antecedents, and along with waxy paleness, progressive debility, diarrhœa and swelling of the ankles, indicates the amyloid lesion.

The male sex is, notwithstanding certain causes affect women only, a favoring condition of pancreatic diseases, in the proportion 193 to 129. (Clæssen).

Middle life, twenty-fifth to sixtieth years, presents the largest number of cases, but no age is exempt.

Whilst these conditions are usually antecedent to pancreatic disease, there are a number which are apparently a direct effect of such disease. Of these are:

Syncope, which appears identified therewith in two ways, viz., immediate contiguity to the solar plexus, and involve-

ment of it; and also, the usual reflex influence of abdominal irritations on the heart.

Collapse, for like reasons, may be extreme.

Sudden death, even, may result. In a number of such cases, pancreatic hæmorrhage has occurred.

Marasmus may slowly exhaust the patient, as in other abdominal diseases.

Hypochondriasis and melancholia have been attributed to pancreatic disease. Indeed, this gland of old disputed with the spleen, etc., the honor of producing the supposed "humor" called "black bile;" whence the latter name.

Albuminuria is sometimes incidental to disease of the pancreas, inasmuch as the kidneys, with a number of other organs, including this gland, together may undergo parenchymatous degeneration (see Frerichs on "Acute Yellow Atrophy of the Liver.")

Lipuria, or oily urine has been found in pancreatic disease, along with fatty stools.

Melituria is a very notable symptom in many cases of such diseases, especially with atrophy of the gland tissue. This goes to show diabetes mellitus to be a disease of deficiency, rather than excessive function.

Addison's disease has been repeatedly found associated with alterations of the pancreas. This is probably due to the extension of lesions from the gland to the supra-renal capsules, or *vice versa*; the history of symptom-evolution should indicate which.

As local lesions with pancreatic disease we may have:

Atelectasis, or collapse of the lower lobes of the lungs, resulting from the upward pressure of the diaphragm, in pancreatic disease with inflammatory bloat of the intestines.

Edema of the lungs has been found after pancreatitis

especially when disease of the heart with pulmonary stasis was present.

Pneumonia has proved introductory to pancreatitis (erysipelatous pneumonia).

Splenic tumor, or parenchymatous splenitis, often co-exists with pancreatic diseases.

Catarrh of the stomach and of the duodenum, hence dyspepsia frequently attends and precedes pancreatic disease, probably because the parenchymatous inflammation of the mucous membrane obstructs or inflames the duct of Wirsung and its branches.

Jaundice naturally appears in this connection, by swelling in the bile-ducts.

Stenosis of the duodenum, by new growths, etc., may involve the duct of the gland, and prevent the exit of secretion.

Abscess of the pancreas and its bed may cause adhesions with the stomach, and when these open, vomiting of pus, etc.

Ulceration of the stomach, on the other hand, may cause adhesion to the pancreas, and extension of the lesion to it. Gastritis without ulcer may do likewise.

Cancer of the stomach, duodenum, omentum, or other neighboring part, may extend to the gland, with or without perforation.

Cancer of the gland, usually of the head, may extend to the stomach, duodenum, etc. The history of the symptoms is important to the discrimination.

Other tumors, or even impactions, may interfere with the duct of Wirsung. Biliary calculi in the gall-duct, lumbrici, or other foreign bodies; intussusception of the colon, impacted feces, etc., are to be thought of. Enlarged lymph glands are also liable to be found in the transverse fissure of

the liver, and may thus act. All these enlargements require differentiation from those of the pancreas itself.

Aneurism of the aorta or of one of its visceral branches should be also included as a possible cause of pressure. On the other hand, the aorta has suffered stenosis below the enlarged gland from its pressure; with an aneurismal dilatation above the same, forming a characteristic pulsating tumor, with expansive lateral (not merely perpendicular) motion. The latter may exist when the enlarged gland simply overlies the normal vessel.

Cirrhosis of the liver, an atrophic induration of that organ, may, by blood reflux, generate chronic congestion and interstitial pancreatitis, with atrophy, etc. Ascites may co-exist; also in the next, viz.:

Peritonitis; it may be localized near the gland, in pancreatitis; or if general, may extend to this organ.

Ascites sometimes follows diseased enlargement of the head of the pancreas, owing to compression of the adjacent portal vein.

Dropsy of the legs may be consecutive to the same, because the pressure falls upon the vena cava.

Hæmorrhoids may arise from such epi-venous pressure.

Parotitis has proved metastatic to the pancreas, with a re-metastasis to the parotid glands.

In all these co-existing affections, it is important to determine, if possible, which was first in the evolution of the case. Hence, the history of the symptoms should be minutely obtained and recorded, and subsequent developments noted in order.

Along with these varied lesions, certain symptoms of a dynamic, sympathetic, or collateral nature, have been carefully observed in patients who succumbed, and were examined post-mortem. They are by no means pathognomonic

of pancreatic inflammation or other lesion, but belong in common to many, especially abdominal diseases; nevertheless, it is only fair to say that their presence should invariably raise the question of pancreatic disease.

Should a palpable tumor be also present in this region, still more care and attention should be given to that question, and all possible tumors in that region differentiated, anatomically, physiologically and historically.

These collateral symptoms, are often of the highest rank in selecting the remedy; but this belongs to another department of our subject, and we will therefore here consider only their pathological bearing, in which their rank is lowest, so far as special lesions and diagnosis are concerned; nevertheless, in the individuality of the particular pathological person, they are still of highest pathological meaning in reference to the most subtle and evasive elements of the total pathology.

These symptoms, in accordance with the Hahnemannian schema, may be stated as follows; not, however, that all of them apply to every pancreatic disease, by any means, but only that, in various cases, they have all been demonstrably associated with some kind of pancreatic lesion. Thus in the

General.—Restlessness. Asthenia. Emaciation. Obesity. Collapse. Worse in morning; when erect. Better when bending forward.

Mind.—Anxiety; oppression; melancholy; hypochondriasis.

Sensorium.—Vertigo.

Head.—Headache; jerking of the head, etc.

Face.—Sunken. Waxy paleness in amyloid degeneration.

Mouth.—Dry tongue; coated, moist tongue; ptyalism.

Appetite.—Anorexia; thirst.

Gastric.—Dyspepsia; belching; nausea; vomiting, saliva-like, purulent, bloody, bilious; chronic vomiting; pyrosis; cardialgia.

Diaphragm.—Hiccough; inertia of the diaphragm, and upward relaxation.

Abdomen.—Deep-seated epigastric pains; violent, radiating, celiac neuralgia; flatulence; meteorism; colic, flatulent, spasmodic or biliary; ascites. Palpable tumor. Pain referred to the transverse colon. Peritonitis.

Stool.—Constipation; diarrhœa; bloody evacuations; purulent stools; undigested meat in stools; fatty stools; leucin in stools; clay-colored stools, if jaundiced.

Urine.—Frequent and profuse micturition; diabetes mellitus. Albuminuria. Lipuria.

Sexual.—Amenorrhœa; pregnancy; climaxis.

Respiratory.—Asthma. Pneumonia (erysipelatosus). Dyspnoea; œdema of the lungs; rattling, suffocative respiration. Atelectasis.

Extremities.—Coldness. Dropsy of the legs; jerking.

Skin.—Jaundice.

Fever.—Heat. Cold sweat. Fever of all types; intermittent, remittent, continued. Cardiac and vaso-motor troubles.

Most of these symptoms may be well studied in view of Schiff's experiments on criminals. He seems to have proved that the stomach, pancreas and spleen form a trio in digestion. Removal or injury of the spleen throws an extra duty of albuminous digestion on the stomach, or rather, its power of digestion is more than doubled; but the pancreas ceases to have any effect on that class of food, which, normally, it shares with the stomach. On the contrary, this gland at the same time gains more power over fat and starch. Both the stomach and the pancreas secrete, according to late

views, because they are charged with secretable matters from the blood; the stomach, directly from its own vessels; the pancreas, in some way by intervention of the spleen; the former being called peptogens; the latter pancreatogens. The splenic activity favors the formation of pancreatine for albuminous digestion; the other two forms of pancreatine, that for the fats, and the other for starch, being jointly produced; but splenic disability augments these two. Hence, minute pathology suggests that splenic disorder affects the pancreas, and implies its derangement; especially if the primary or stomach digestion be at the same time increased, and late or pancreatic digestion of meats and other albumens diminished; and still further, if fat and starch be better digested than before. All of which pre-supposes the gland in good anatomical order. If, on the other hand, it be atrophied, or obstructed, or otherwise disabled, all pancreatic digestion ceases; late dyspeptic symptoms arise; albumens, fat and starch, all are dependent mainly on the stomach, and all fail of full digestion; fatty stools increase, especially if not emulsified by the bile (this, when the gall-duct is closed by the contiguous disease); and diabetes mellitus occurs. And why? It appears to be true that pancreatic action on starchy food is certainly wanting; wherefore deficient pancreatism is causative of diabetes. Such seems the rational deduction. If, then, we can suppose the absorption of undigested starch by the thoracic duct, instead of being modified by absorption into and detention in the liver, it would thus directly reach the general circulation; there, or in the tissues, becoming sugar in excess. In the opinion of the present writer, it would be desirable, in diabetes, to examine post-mortem, not only the blood, but, as well, the contents of the thoracic duct, for the presence of abnormal products of digestion, especially for free or undi-

gested starch; also, for any other excess of glycogenous materials; add not alone the liver; for the control of sugar formation by this organ may be simply conservative, since many organs and tissues, even including the placenta, are capable of the same. Non-action of the liver on such starchy elements is also to be then implied. An abnormal absorption of these materials by the thoracic duct (perhaps with jaundice from obstruction and non-bilious emulsion), instead of by a disabled portal vein or liver, appears by no means impossible; whilst such a direct invasion of the blood would easily account for the saccharine urine. But only non-pancreatinized starch is here meant.

Pancreatic disease, if chronic, often does occur with diabetes, not invariably, however; and the reasons are obscure, owing to the aforesaid vicarious action subsisting between this and other organs, and the uncertainty of meaning thus inherent in the symptoms. Other theories of diabetes from pancreatic disease, are extant. Thus, Popper, quoted by Friedreich, gives special attention to the known function of the gland in separating the blood-fats into glycerine and fatty acids. Now, the latter reach the liver, being absorbed along with glycogenous hydro-carbon (starch, etc.), by the portal vein, both going to form biliary acids. Loss of this pancreatic function cuts off the supply of fatty acids, impairs the formation of biliary acids, and casts the unused glycogen on the blood, forming grape sugar, to be later found in the urine; or going in part to determine corpulence, which sometimes occurs in diabetics; supposing that obesity did not precede. This may be true in some cases, but not all diabetics have pancreatic disease, and not all pancreatic disease is attended by diabetes; also, many diabetics show no sign of corpulency.

Friedrich attaches most importance to the implication of

the solar plexus of nerves, lying adjacent to the diseased gland or even making the nervous lesion antecedent; since Munk and Klebs, experimenting on dogs, produced saccharine urine and atrophy of the pancreas, by partial or complete extirpation of this plexus. This, however, is only tantamount to the disabling of the gland, and its associated organs, in any other way; leaving the original question, viz., the dependence of diabetes on the atrophy, in *statu quo*.

CHAPTER V.

DIAGNOSIS OF PANCREATIC DISEASES.

This subject is involved in such obscurity that we can scarcely hope to do more than give a few rules for the examination, and hints at the differentiation of the various forms of pancreatic disease. In fact, so little that may be called characteristic, is known of the symptoms developed through any idiopathic affection of the pancreas, that it may safely be asserted that we are not acquainted with a single pathognomonic symptom indicative of any of the various affections to which this organ is liable. This no doubt is, at least in part, due to the neglect shown by the profession to the examination of this organ after death, as well as to the lack of systematic study of the symptoms found in connection with known cases of pancreatic disease.

The neglect here spoken of has been almost universal. Even Virchow, who was so forward in everything pertaining to systematic post-mortem investigation, has been betrayed into the assertion that the slight importance of this organ, in a pathologico-anatomical point of view, causes its examination to be of little consequence, (vide *Post Mortem Examinations*, Virchow, page 31.) Yet Clæssen tabulated 322 cases of pancreatic disease, certainly a sufficient number to act as an incentive to a more careful study of the pancreas in its diseased states.

In attempting the diagnosis of any of the affections to which this organ is liable, we must first of all carefully study its relation to the neighboring organs. Its deep seated

position must be borne in mind. Equally important also are the intimate anatomical relations of the pancreas to the solar plexus and its ganglia, and the topographical relation of the pancreas to the ductus choledochus. This latter being important from the fact that, under certain conditions, jaundice may arise, in any disease which results in either swelling or contraction of the gland substance.

Physical examination by palpation and percussion, has never given satisfactory results; partly on account of the depth at which the organ lies, but often and largely to the frequently coexistent diseased condition of the stomach, duodenum, liver, spleen, kidneys, mesentery, or omentum. In fact, unless the pancreas has attained to a considerable size, and at the same time has become more or less indurated, palpation will reveal but little; while, owing to the superficial sensitiveness so frequently met with, both palpation and percussion fail to give any useful results. In advanced stages of morbid growths of the pancreas, the neighboring organs are usually involved to such a degree as seriously to prejudice the certainty of a diagnosis.

Owing to these difficulties, the writer, in attempting the physical diagnosis of pancreatic disease, was led to employ a method, which might not inappropriately be termed "impulsion," in the hope that by this means he might be enabled to detect such disease in its early stages. Though not able to speak so positively as he would desire, he nevertheless thinks some points, worthy of notice, have been developed.

In order to examine the pancreas by impulsion, the patient should, if possible, stand upright, thus keeping the abdominal muscles more or less tense. Let the examiner, sitting to the right of the patient, place his left hand over the tenth and eleventh dorsal vertebræ, his right hand at

the upper portion of the hypogastric region. Then by a strong and sudden push, made with the right hand upwards and backwards, an impulse is communicated through the abdomen to the pancreas, which, if the pancreas be unduly sensitive, will elicit an aching or bruised, sore feeling. The patient may at first find some difficulty in locating this new sensation, both on account of its more or less indefinite character, as well as from its being experienced at a point different from that to which the usual pain had been referred.

Next, let the examiner, seated in front of the patient, place his right hand at the posterior border of the left lower lateral region of the thorax, at about the tenth to twelfth rib; then with his left hand placed at the anterior border of the right lumbar region, just below the position of the head of the pancreas, make strong impulsion upwards, backwards and towards the patient's left. If the pancreas be morbidly sensitive a pain may be elicited similar in location and character to that before observed. In this position we have, as it were, the pancreas between our hands. The head being fixed in the curve of the duodenum any strong impulse from right to left and backwards will disturb its position, or at least bring pressure to bear upon it far better than either palpation or percussion.

Though impulsion will not enable us to differentiate the various forms of pancreatic disease, it will, nevertheless, in many instances, throw light upon cases which otherwise would appear to be of gastric or hepatic functional origin. These few hints in relation to impulsion are probably sufficient for our present purpose.

[Since the above was written the writer has been able, in one case to corroborate a diagnosis of malignant disease of the pancreas made by impulsion. The autopsy proved it to be a primary sarcoma of the pancreas.—A. K.]

The symptoms of pancreatic disease are too little known to afford us positive data on which to base a differential diagnosis, still we shall, as far as possible, give the important diagnostic points of the following.

ACUTE PRIMARY PANCREATITIS.

Among the most important symptoms of this rare form of disease we may mention, colicky, or deep seated dull pains, commencing in the epigastrium and shooting either towards the shoulder or toward the spine. This pain may, in a short time, become very intense, and may be accompanied by great restlessness; præcordial anxiety; dyspnœa, tendency to faint; nausea; eructations and vomiting of a thin, bile-stained fluid, which affords no relief; or the vomit may be of a clear, or greenish, viscid fluid. Thirst is often present, though the tongue is moist. This moisture of the tongue is usually marked in pancreatic disease, standing in contrast with the dry tongue of inflammatory affections of other abdominal organs. The bowels are usually constipated; distention of the abdomen is not uncommon, and, when existing, interferes seriously with physical examination by palpation or percussion, but not to so great a degree with impulsion.

Slight pyrexia generally accompanies this condition.

In unfavorable cases the symptoms attain their greatest intensity within a few days; the pulse then becomes small, suppressed and irregular; the extremities cold; and the features hippocratic; death taking place in acute collapse. In case the inflammatory process goes on to suppuration, we have rigors, alternating with flushes of heat. If the peritoneum becomes involved, symptoms of local or general peritonitis supervene. Acute pancreatitis must be carefully differentiated from acute inflammation of the adjacent abdominal organs.

From acute gastritis it may be distinguished by the fact that this affection is generally superinduced by corrosive or irritating substances, especially the mineral and acrid poisons, as Arsenic, Tartar emetic; mustard; Ipecacuanha, etc.; or from irritative substances, taken as food, such as decomposing meat, vegetables, or shell fish; or from very cold or very hot food or drink; in addition to which we find wanting the more characteristic vomiting of all food and drink, together with the aversion to eating, so common in acute gastritis.

From acute hepatitis it may be known, as in this affection we have more or less hepatic pain, which is aggravated by pressure as well as by deep inspiration and from cough. The yellow tinge of the conjunctiva, or more fully developed jaundice, though so characteristic of hepatitis, may also be found in acute pancreatitis when it is accompanied by much swelling of the gland, in cases where the ductus choledochus passes partially or mainly through the head of the pancreas. Swelling of the head of the pancreas, in such cases, causes closure of the duct, thus obstructing the flow of bile. Here, however, the location of the pain, and especially the marked sensitiveness of the liver on percussion or palpation in cases of hepatitis, will usually serve to prevent error.

From hepatic colic it may be distinguished by the difference in the starting point and location of the pains; in hepatic colic the pain being referred to the gall-bladder and from thence radiating to the chest, shoulder and other parts; again in hepatic colic, save when of short duration, we have jaundice; this, though possible, is not common in acute pancreatitis. The previous history will also throw light on the nature of the case.

ACUTE SECONDARY PANCREATITIS.

According to Friedreich, the diagnosis of this affection is not at present possible, though its presence may be suspected, if, in a severe case of infectious disease, we have in addition to the high fever, the clinical features of acute parenchymatous degeneration of the liver (acute swelling), and of the kidneys (albuminuria), together with enlargement of the spleen. It is also possible that the intercurrent jaundice, arising during the course of some very acute infectious diseases, may be due to the pressure of an acutely inflamed (enlarged) pancreas upon the ductus choledochus.

Metastatic abscess constitutes another form of secondary inflammation of the pancreas. This form is very rare and its diagnosis impossible, though in pyæmic, or puerperal disease, its presence may be suspected if the epigastric pains, together with the characteristic vomit, or fatty stools, be present.

A possible metastasis to the pancreas, in cases of parotitis, has been suggested. Evidence in support of this is wanting, though from a few published reports it would appear that further observation in this direction might yield affirmative results.

CHRONIC PANCREATITIS.

But little is known of the symptomatology of this affection. The organic changes in the stomach, duodenum, peritoneum, liver, kidneys, etc., with which it is complicated, or rather of which it forms a complication, makes a diagnosis practically impossible.

The emaciation, the sensation of weight or pain in the epigastrium, pyrosis, vomiting, increased flow of saliva,

prominent as they are in this affection, are met with to the same degree in other affections. More important, however, are the fatty stools, an intercurrent melituria, the epigastric pain of a neuralgic nature, and especially, an appreciable and deeply seated swelling across the epigastric region; these would lend great probability the diagnosis of the pancreatic disease. Jaundice is frequently met with in chronic pancreatitis even when there is no accompanying disease of the liver. This may be due either to pressure of the head of the pancreas upon, and consequent obstruction of, the ductus choledochus, or to obstruction and closure resulting from contraction of the pancreas during the later stages of the disease. If the pancreas press upon the vena porta, thus interfering with the portal circulation, ascites may result; if on the inferior vena cava, œdema of the lower extremities; if on the duodenum, we may have symptoms of intestinal stenosis. Any of these conditions, if present, will complicate matters so as to make the diagnosis more and more uncertain; while if these conditions, owing to the slow progress of the pancreatic disease, develop gradually, an error of diagnosis is scarcely to be avoided.

The presence of fatty stools, melituria, or an appreciable tumor in the epigastrium, though pointing directly to the pancreas, still leave us to differentiate between chronic pancreatitis and cancer. In cases of cancer, however, the symptoms of cancer cachexia will usually be present in sufficient degree to assist in the diagnosis.

MORBID GROWTHS.

Cancer.—This is by far the most common of pancreatic new growths, being also the most frequently met primary disease of this organ, though withal, very rare.

The symptoms manifest by this affection are by no means clearly indicative thereof, while, in addition to this source of difficulty, we find them generally modified by similar disease of one or other of the surrounding organs. Thus we may have symptoms pointing either to constrictive disease of the stomach or duodenum; or, symptoms of chronic gastric catarrh; or of progressive liver disease, with or without jaundice. Among the symptoms of cancer of the pancreas may be mentioned, watery eructation or watery vomiting, great thirst with moist tongue, and extreme emaciation. These were looked upon by Hohnbaum as very reliable, but from what we have already said regarding these symptoms, it may readily be conceived how little dependence is to be placed upon any of them as especially indicative of cancer. Pressure by the cancerous growth upon the surrounding organs may give rise to most varied symptoms, often tending to obscure the diagnosis, and in many cases even making it impossible.

Probably one of the most important symptoms of this disease is the intense and persistent pain deep in the epigastrium. This pain is of marked neuralgic type, has times of remission, often coming on in paroxysms which may continue from a few minutes to even days; it can scarcely be said to intermit, as, in most cases, a constant though less severe pain is experienced between the paroxysms. This latter condition is not met to the same degree in chronic pancreatitis, where, though the pains may be equally severe, there are times of entire cessation.

The pain in cancer may be either local, confined to a spot deep in the epigastrium, or it may extend across the epigastrium to either one or the other hypochondrium, most frequently to the right; or it may shoot toward the back, sacrum or shoulder. At other times the pain may spread

from the epigastric region through the entire abdomen. Position exerts considerable influence in modifying the pain, it being decidedly aggravated in the upright position and markedly relieved when the abdominal muscles are flexed. An appreciable tumor affords important evidence in this affection, though unfortunately, owing to the position of the pancreas, this in most cases, does not exist. The head of the pancreas, being the part most frequently attacked, lying beneath the liver is beyond the reach of both palpation and percussion. Even in the more favorable cases it will be necessary to examine the patient when the stomach is empty, care being taken that the bowels have been thoroughly evacuated of all solid fecal matter. The abdominal muscles must be thoroughly relaxed, the patient either lying on the back with the knees well drawn up, or placed in the knee-elbow position. In some cases it will be necessary to employ an anæsthetic for the purpose of gaining thorough relaxation of the abdominal muscles. Even when we have discovered such tumor, unless we can exclude cancer of the stomach, liver or omentum, we are not in a position to give a positive diagnosis.

Finally, if the patient be advanced in years, and of marked cachectic habit, suffers from a continuous pain in the epigastrium, and a tumor be found located deep in the same region, and in addition, we have ground to exclude primary disease of the neighboring abdominal organs, we have fair reasons on which to diagnose cancer and to locate the disease in the pancreas. The presence of fatty stools, or melituria, adds largely to the certainty. The size, nodulation and density of the growth would distinguish it from chronic enlargement, as would the density and nodulation from cystic degeneration.

Sarcoma of the pancreas cannot be diagnosed from cancer, as the symptoms and conditions accompanying the one affection are likewise found with the other.

CYSTS OF THE PANCREAS.

The diagnosis of cysts of the pancreas is possible only in cases where they have attained considerable size. The swelling presents a round or oval, smooth surface, and if within reach of physical examination fluctuation may possibly be detected. The tumor, when accessible, will be found lying deep in the epigastric region. The pains are much less intense than the cancer pains. The cancer cachexia and extreme emaciation are wanting. This fact will warrant the exclusion of cancer. The presence of fatty stools or melituria, together with the before-mentioned physical signs, would render the diagnosis very probable. In such cases care must be taken not to mistake the pancreatic cyst for an aneurism of the aorta, as the pulsatile movements which might be communicated by the normal aorta may simulate aneurism.

CALCULI.

A fixed calculus may cause various forms of change; thus may arise chronic interstitial inflammation, induration, atrophy of the gland, parenchyma, or we may have a peri-pancreatitis with acute irritation of the surrounding structure; or purulent inflammation may result; cysts also may form. Fatty stools and melituria have also been observed in a number of cases. Jaundice may arise from pressure upon the ductus choledochus preventing the normal flow of the bile. From the above, it will be evident that the presence of a pancreatic calculus cannot be diagnosed during life.

HÆMORRHAGE IN THE PANCREAS.

This form of hæmorrhage generally results in sudden, almost instantaneous death, therefore no time is allowed for diagnosis during life. If such sudden death occur in a patient who previously suffered from symptoms referable to the pancreas, and there existed no evidence of organic affection of other of the viscera, hæmorrhage of the pancreas may be suspected. The only case of this form of pancreatic disease which the writer had the privilege of examining, had suffered for many years with violent so-called "bilious attacks." During such an attack she was found with an extremely rapid and weak pulse and heart's action. The pains were promptly relieved by the indicated remedy, and the patient was ordered to keep the recumbent posture until my next visit. Contrary to this order the patient arose from bed within an hour after my departure, sat down beside the bed and died instantly. The post-mortem examination showed fatty degeneration of the heart, liver and pancreas, some of the vessels of the pancreas having undergone complete fatty metamorphosis.

FATTY DEGENERATION OF THE PANCREAS.

This may result from a chronic inflammation of the gland, but it is usually found only in cases of general obesity; especially also in drunkards. It offers no pathognomonic symptoms, though the fatty stools and melituria may be present, and it may be accompanied by pains very similar in character to those mentioned under cancer, but may be distinguished by the long intermissions during which no sign of the trouble can be found. Such was the case in the patient just alluded to.

Amyloid disease.—This is usually found only in conjunction with marked amyloid change in other organs, and, like fatty degeneration, cannot be recognized during life.

PROGNOSIS OF PANCREATIC DISEASES.

So few cases of disease of the pancreas have been recorded that but little can be said in regard to the prognosis of the various forms of affection to which this gland is liable, but from the known favorable action of remedies, when applied under the law of similars, in the treatment of diseases of kindred glands, we would be led to believe that a favorable prognosis might be given in many cases of acute pancreatitis, also in the early stages of chronic pancreatitis. As regards morbid growths, cysts, concretions, etc., we are at present unable to speak favorably, as most of such cases, thus far recorded, have been unrecognized prior to the autopsy. In general, owing to the uncertainty surrounding the diagnosis of pancreatic disease as well as the fact that many cases of supposed gastric, hepatic, or intestinal origin, have in reality been dependent upon disease of the pancreas, it is but fair to infer that many unrecognized cases have recovered.

CHAPTER VI.

PANCREATIC THERAPEUTICS.

The therapeutics of diseases of the pancreas are very deficient. Works on poisons, as those of Wormley, Taylor, Reese and Ziemssen, seem to make no mention of the action of poisons on this viscus; nor do they include its pathological changes in their description of autopsies. Equally unsatisfactory is the medical literature of all schools.

In our own text-books and works on therapeutics, *Iris versicolor* is mentioned as a leading remedy in acute inflammation of the pancreas; and Phosphorus and Arsenic, in fatty degeneration.

Since a prominent function of the pancreas is the contribution of a juice, which behaves like saliva, we may, perhaps be allowed to examine drugs which act upon the salivary glands, and determine if they have any of the symptoms supposed to indicate pancreatic disease.

We add, then, in tabular form, the symptoms of *Bellad.*, *Mercur.*, *Conium*, *Carbo animal.*, *Carbo vegetab.*, *Rhus tox.*, *Hepar sul.*, *Kali carb.*, *Dulcam.*, *Baryta*, *Lycopod.*, *Silicea*, *Sulph.*, *Thuja*, *Calc. ostr.*, *Iod.*, *Podoph.*, *Nitric ac.* and *Colchic.*, with a few others, whose symptoms are suggestive.

Soapy taste: *Iris vers.*, *Iod.*, *Dulcam.*, *Rhus tox.*

Raises a watery fluid: *Bellad.*, *Carbo veg.*, *Dulcam.*, *Mercur.*, *Hepar sulph.*, *Uranium nitrate*, *Iris vers.*

Icterus: *Mercur.*, *Iris vers.*, *Podophyl.*, *Lycopod.*, *Dulcam.*, *Sulph.*, *Digital.*, *Aurum.*

Pains in the region of the cœliac axis: *Iris vers.*, *Colchic.*,

Phosph., Arsenic, Plumb., Rhus tox., Stann., Plat., Kali bich.

Pains deep in between the pit of the stomach and navel; in addition to the above: Zinc, Carbo animal., Carbo veg., Conium, Thuja.

Ulceration of the duodenum: Arsenic, Kali bich., Uran. nitrate.

Stools contain fat: Iris vers., Iod., Phosph., Arsenic, Asclepias tub.(?) Thuja(?) Polyp. o., Sul., Cauc. f., Fagop., Fer. met., Pic. ac.

Stools undigested: Arsenic, Phosph., Calc. ost., Iris vers., Graph., Sulph., Nitric ac.

Stools with emaciation: Arsenic, Phosph.

Fatty degeneration of the pancreas: Phosph., Sil., Arsenic.

Diabetes mellitus: Phosph., Arsenic, (Uranium nitrate).

Buchner recommends the following: Bellad., catarrh of the salivary ducts. Follow with Mercurius.

Pulsat., Calc. ost., in chlorotic girls.

Salts of lime for hypertrophy of the pancreas.

Inflammation: Bellad., Con., Hepar, Merc. With sup-
puration: Calc., Hep., Sil.

Scrofulous patients: Calc. jod.

Erythematous patients, or skin affections: Calc. acet.

Cardiac or renal diseases: Calc. ars.

Tuberculosis: Calc. phos.

Melanosis: Calc. oxal.

Gangrene or softening: Krcos., Secale c.

Pancreatic stones: Bell., Salts of lime, Potash and soda.

Cancer: Phos., Sil., Calc. ars., (latter with burning).

Icterus: Bell., Merc., Digit., Aurum.

Atrophy: Phosph.

Diabetes: Phosph.

In epidemic diseases: *Rhus tox.*, then *Calc.*, *Ars.*

Iris versicolor.—Burning distress in the region of the pancreas; vomiting of a sweetish water; saliva has a greasy taste; green watery diarrhœa, worse from 2 to 3 A. M.; offensive flatus, smelling like copper. Diarrhœa contains undigested fat; bilious vomiting; sick headaches return periodically every week; dull, throbbing or shooting over one eye, usually over the right, with dim vision, nausea and vomiting.

Congestion and rupture of minute vessels in the pancreas of a cat poisoned with *Iris*.

Iodine.—Great emaciation; hungry, anxious if he cannot get food at the appointed times; cats enormously, yet grows thin; soapy taste; fat in the stools; glands enlarged, or atrophied; lungs affected.

Phosphorus.—May prove valuable in tuberculous patients; or when there are evidences of fatty degeneration of various organs; especially of the heart, liver or kidneys; distressing burning pains in the cœliac axis; stools undigested, containing particles of fat; face pale yellow; anæmia; atrophy of the pancreas with diabetes mellitus. One of the best remedies in neuralgia of the cœliac plexus.

The *Phosphorus* diarrhœa containing small particles like sago, or, as expressed by some, like tallow, is not the fatty diarrhœa which suggests the drug in pancreatic diseases.

Arsenicum.—Organic changes similar to those mentioned under *Phosphorus*; but distinguished by greater restlessness and anxiety, as if the pains would drive him to despair. Ulceration of the duodenum, which, by extension, involves the pancreatic duct. This ulceration may be a result of burns, of malignant disease, etc. Neuralgia of the cœliac plexus. Stools undigested, containing fat.

Uranium nitrate.—Causes ulceration of the duodenum and also of the pyloric end of the stomach. It should therefore be remembered as a possible remedy, when the pancreas is secondarily involved. The stomach symptoms are: vomiting of a white fluid; putrid eructations; pains worse from fasting. The kidneys are usually affected; the urine deposits a mucopurulent looking sediment, and contains albumen, phosphates, lithic acid, in excess. Glycosuria.

Lycopodium.—According to Dunham, causes a chronic duodenitis; pressure on the hypochondrium produces tender pains in the epigastrium and *vice versa*. If, then, the pancreatic duct is involved, and we have the well-attested dyspeptic symptoms of *Lycopodium* and jaundice, it may prove curative. It should also be remembered in pancreatic stones.

If a pancreatic tumor is diagnosed, we may study the calcareous preparations, as advised by Buchner, and also: Conium, deepseated lancinating pains; tumor feels hard, nodulated: Zinc,* Carbo an. and veg., Iodine, Phosph., Sil., Arsenic, etc.

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